WHAT IS CLAIMED IS:

1. An image input/output control apparatus for performing input/output of image data with an external apparatus, comprising:

control means for controlling the input/output of the image data with the external apparatus;

plural image processing means for performing predetermined image processes to the image data; and

plural data transfer means for connecting each of said plural image processing means and said control means like a ring and performing data transfer,

wherein each of said plural image processing means and said control means are composed respectively on different units.

2. An apparatus according to Claim 1, wherein said control means performs processing setting for said plural image processing means through said data transfer means, and said plural image processing means perform the processes on the basis of the processing setting.

3. An apparatus according to Claim 2, wherein said plural image processing means connect with the external apparatus and perform the input/output of the image data with said external apparatus on the basis of the processing setting by said control means.

4. An apparatus according to Claim 1, wherein

said control means includes first generation means

for generating a command packet in which a header

including discrimination information to discriminate to

5   which of said plural image processing means the

processing setting should be performed is added to

command data including processing information to

perform the processing setting for said plural image

processing means,

10   said plural image processing means include first

packet control means for analyzing the header of the

input command packet and controlling the process

concerning the input command packet based on the

discrimination information described on the header, and

15   said data transfer means transfers the command

packet.

5. An apparatus according to Claim 4, further

comprising:

20   second generation means for generating a data

packet in which a header including discrimination

information to discriminate by which of said plural

image processing means the process should be performed

is added to rectangular image data having a

25   predetermined size; and

second packet control means for analyzing the

header of the input data packet and controlling the

process concerning the input data packet based on the

discrimination information described on the header,

wherein said data transfer means transfers the

data packet.

6. An image processing apparatus comprising:

plural image processing means for performing

predetermined image processes to image data;

first generation means for generating a command

packet in which a header including discrimination

information to discriminate to which of said plural

image processing means processing setting should be

performed is added to command data including processing

information to perform the processing setting for said

plural image processing means;

packet transfer means for connecting each of said

plural image processing means and said first generation

means and performing packet transfer,

wherein said plural image processing means analyze

the header of the input command packet and control the

process concerning the input command packet on the

basis of the discrimination information described on

the header.

7. An apparatus according to Claim 6, wherein

said plural image processing means perform control so

that said command packet is output, if the

discrimination information of said command packet is
uncoincident with own discrimination information, and
perform control so that internal processing setting is
performed according to the command data of said command
5   packet, if the discrimination information of said
command packet is coincident with own discrimination
information.

8.   An apparatus according to Claim 6, further
10   comprising:
second generation means for generating a data
packet in which a header including discrimination
information to discriminate by which of said plural
image processing means the process should be performed
15   is added to rectangular image data having a
predetermined size,
wherein said packet transfer means transfers the
data packet between each image processing means and
said second generation means, and
20   said plural image processing means analyze the
header of the input data packet and control the process
concerning the input data packet on the basis of the
discrimination information described on the header.

25   9.   An apparatus according to Claim 8, wherein
said plural image processing means perform control so
that said data packet is output, if the discrimination

information of said data packet is uncoincident with
own discrimination information, and perform control so
that internal processes based on the rectangular image
data of said data packet are performed, if the
5   discrimination information of said data packet is
coincident with own discrimination information.

    10. An apparatus according to Claim 8, wherein
said packet transfer means connects each of said plural
10   image processing means, said first generation means and
said second generation means like a ring.

    11. An apparatus according to Claim 10, wherein
each of said plural image processing means and said
15   first generation means are composed respectively on
different units.

    12. An apparatus according to Claim 6, wherein
said plural image processing means connect with an
20   external apparatus and perform input/output of image
data with the external apparatus on the basis of the
processing setting by said command packet.

    13. An image input/output control apparatus
25   comprising:

    control means, connected to a memory for storing
image data, for controlling input/output of the image

data performed with an external apparatus;

first image processing means, connected to an image output apparatus, for performing a predetermined image process to image data to be output by said image

5   output apparatus, on the basis of processing setting information sent from said control means;

second image processing means, connected to an image input apparatus, for performing a predetermined image process to image data input by said image input

10   apparatus, on the basis of the processing setting information sent from said control means; and

data transfer means for establishing ring-like connection between said control means and said first image processing means, between said first image

15   processing means and said second image processing means, and between said second image processing means and said control means, and unidirectionally transferring the setting processing information and the image data.

20

14.   An apparatus according to Claim 13, wherein said second image processing means transfers the image data input by said image input apparatus to said control means on the basis of the processing setting

25   information,

said control means stores the image data received from said second image processing means in said memory,

and transfers the image data in said memory to said

first image processing means after storing the image

data of a predetermined amount in said memory, and

said first image processing means outputs the

5   image data received from said control means to said

image output apparatus on the basis of the processing

setting information.

15.   An apparatus according to Claim 14, wherein

10   said image input apparatus is a scanner for

inputting image data by reading an original image,

said image output apparatus is a printer for

printing an image on a predetermined sheet on the basis

of the image data, and

15   the processing setting information is the setting

information for a copying process using said scanner

and said printer.

16.   An apparatus according to Claim 13, wherein

20   said control means, said first image processing means

and said second image processing means are composed

respectively on different semiconductor substrates.

17.   An apparatus according to Claim 13, wherein

25   said data transfer means transfers the image data in

unit of rectangular image data having a predetermined

size.

18. An image input/output control apparatus comprising:

control means, connected to a memory for storing image data, for controlling input/output of the image data performed with an external apparatus;

first image processing means, connected to an image output apparatus, for performing a predetermined image process to image data to be output by said image output apparatus, on the basis of processing setting information sent from said control means;

second image processing means, connected to an image input apparatus, for performing a predetermined image process to image data input by said image input apparatus, on the basis of the processing setting information sent from said control means;

third image processing means for performing a predetermined conversion process to the input image data on the basis of the processing setting information sent from said control means; and

data transfer means for establishing ring-like connection between said control means and said first image processing means, between said first image processing means and said second image processing means, between said second image processing means and said third image processing means and between said third image processing means and said control means, and unidirectionally transferring the setting

processing information and the image data.

19. An apparatus according to Claim 18, wherein
said second image processing means transfers the
image data input by said image input apparatus to said
third image processing means on the basis of the
processing setting information,

said third image processing means performs the
predetermined conversion process to the image data
received from said second image processing means and
transfers the conversion-processed image data to said
control means on the basis of the processing setting
information,

said control means stores the image data received
from said third image processing means in said memory,
and transfers the image data in said memory to said
first image processing means after storing the image
data of a predetermined amount in said memory, and

said first image processing means outputs the
image data received from said control means to said
image output apparatus on the basis of the processing
setting information.

20. An apparatus according to Claim 19, wherein
said image input apparatus is a scanner for
inputting image data by reading an original image,
said image output apparatus is a printer for

printing an image on a predetermined sheet on the basis of the image data,

the predetermined conversion process in said third image processing means is a resolution conversion process, and

the processing setting information is the setting information for a magnification-change copying process using said scanner and said printer.

21.   An apparatus according to Claim 18, wherein said control means, said first image processing means, said second image processing means and said third image processing means are composed respectively on different semiconductor substrates.

22.   An apparatus according to Claim 18, wherein said data transfer means transfers the image data in unit of rectangular image data having a predetermined size.

23.   A data communication apparatus which performs transmission/reception of a data packet composed of image data and a header including information concerning the image data, said apparatus comprising:

transmission means for transmitting the data packet; and

reception means for receiving the data packet

transmitted by said transmission means,

wherein said transmission means transmits, after transmitting the data packet, a footer including the same information as that of the header of the

5   transmitted data packet, and

said reception means updates the information of the header on the basis of the received footer.

24.   An apparatus according to Claim 23, further

10   comprising notification means for notifying said reception means whether or not said transmission means transmits the footer,

wherein, if it is unnecessary to update the information of the header, said notification means

15   notifies said reception means that said transmission means does not transmit the footer.

25.   An apparatus according to Claim 23, wherein said reception means writes the received data packet in

20   a predetermined memory, and, after receiving the footer, updates the information of the header by writing the information of the footer at an address where the header has been written.

25   26.   An apparatus according to Claim 23, further comprising encoding means for encoding the image data of said data packet,

wherein said transmission means transmits the image data encoded by said encoding means.

27. An apparatus according to Claim 23, wherein the information included in the header represents an image data length.

28. A data communication apparatus which transmits a data packet composed of image data and a header including information concerning the image data to a predetermined memory, said apparatus comprising:

transmission means for transmitting the data packet to said predetermined memory; and

notification means for notifying said predetermined memory whether or not said transmission means transmits a footer,

wherein, in a case where the content of the header is not yet determined when the data packet is transmitted by said transmission means, said notification means notifies said memory that the image data transmission ends when the last image data is transmitted, and

said transmission means transmits, after the notification by said notification means ended, the footer including information to update the information of the header stored in said predetermined memory.

29. A data communication apparatus which can communicate with plural image processing apparatuses performing image processes of a data packet composed of image data and a header including information

5 concerning the image data, and performs communication using said data packet among said plural image processing apparatuses, said data communication apparatus comprising:

transfer means for transferring said data packet

10 from the image processing apparatus on a transmission side to the image processing apparatus on a reception side; and

setting means for setting either a compression mode or a non-compression mode to the image processing

15 apparatus on the transmission side,

wherein, in a case where the compression mode is set to the image processing apparatus on the transmission side by said setting means, said transfer means transfers information representing transmission

20 of a footer to the image processing apparatus on the reception side, and, after transmitting the data packet, transfers the footer including information to update the information of the header transferred to the image processing apparatus on the reception side.

25

30. An image processing apparatus which performs an image process of a data packet composed of image

data and a header including information concerning the image data, said apparatus comprising:

encoding means for performing a predetermined encoding process to the image data;

5　memory control means for controlling writing of the image data in a memory; and

transfer means for transferring the data packet encoded by said encoding means to said memory control means,

10　wherein said transfer means transfers, after transferring the data packet, a footer including the same information as that of the header of the transferred data packet, and

said memory control means updates the information

15　of the header on the basis of the received footer.

31.　An image processing method in an image processing apparatus which includes plural image processing units for performing predetermined image

20　processes to image data, said method comprising:

a first generation step of generating a command packet in which a header including discrimination information to discriminate to which of the plural image processing units processing setting should be

25　performed is added to command data including processing information to perform the processing setting for the plural image processing units;

a packet transfer step of transferring the command
packet among the plural image processing units; and

a first control step of analyzing, in the plural
image processing units, a header of the command packet

5   transferred in said packet transfer step and
controlling the process concerning the transferred
command packet on the basis of discrimination
information described on the header.

10   32.   A method according to Claim 31, wherein said
first control step performs control so that said
command packet is output from each image processing
unit, if the discrimination information of said command
packet is uncoincident with discrimination information

15   of each image processing unit, and performs control so
that internal processing setting is performed according
to the command data of said command packet in each
image processing unit, if the discrimination
information of said command packet is coincident with

20   the discrimination information of each image processing
unit.

33.   A method according to Claim 31, further
comprising:

25   a second generation step of generating a data
packet in which a header including discrimination
information to discriminate by which of the plural

image processing units the process should be performed

is added to rectangular image data having a

predetermined size, said packet transfer step

transferring said data packet among the plural image

5   processing units; and

a second control step of analyzing, in the plural

image processing units, a header of the data packet

transferred in said packet transfer step, and

controlling the process concerning the input data

10   packet on the basis of discrimination information

described on the header.

34.   A method according to Claim 33, wherein said

second control step performs control so that said data

15   packet is output from each image processing unit, if

the discrimination information of said data packet is

uncoincident with discrimination information of each

image processing unit, and performs control so that an

internal process based on the rectangular image data of

20   said data packet is performed, if the discrimination

information of said data packet is coincident with the

discrimination information of each image processing

unit.

25   35.   A method according to Claim 31, wherein the

plural image processing units are connected like a

ring, and said packet transfer step sequentially

performs the packet transfer along ring-like buses to
each image processing unit.

36. A method according to Claim 31, wherein said
plural image processing units connect with an external
apparatus and perform input/output of image data with
the external apparatus on the basis of the processing
setting in said first control step.

37. An image processing method in an image
input/output control apparatus which includes a control
unit, connected to a memory for storing image data, for
controlling input/output of the image data performed
with an external apparatus, a first image processing
unit connected to an image output apparatus, and a
second image processing unit connected to an image
input apparatus, said method comprising:

a data transfer step of establishing ring-like
connection between the control unit and the first image
processing unit, between the first image processing
unit and the second image processing unit, and between
the second image processing unit and the control unit,
and unidirectionally transferring processing setting
information and the image data;

an input image processing step of performing, in
the second image processing unit, a predetermined image
process to the image data input by the image input

apparatus, on the basis of the processing setting

information sent from the control unit; and

an output image processing step of performing, in

the first image processing unit, a predetermined image

5   process to the image data to be output by the image

output apparatus, on the basis of the processing

setting information sent from the control unit.

38. A method according to Claim 37, wherein

10   said input image processing step transmits the

image data input by the image input apparatus from the

second image processing unit to the control unit on the

basis of the processing setting information,

the control unit stores the image data received

15   from the second image processing unit in the memory,

and transmits the image data in the memory to the first

image processing unit after storing the image data of a

predetermined amount in the memory, and

said output image processing step outputs the

20   image data received from the control unit, from the

first image processing unit to the image output

apparatus on the basis of the processing setting

information.

25   39. A method according to Claim 38, wherein

the image input apparatus is a scanner for

inputting image data by reading an original image,

the image output apparatus is a printer for

printing an image on a predetermined sheet on the basis

of the image data, and

the processing setting information is the setting

5   information for a copying process using the scanner and

the printer.

40.   A method according to Claim 37, wherein the

control unit, the first image processing unit and the

10   second image processing unit are composed respectively

on different semiconductor substrates.

41.   A method according to Claim 37, wherein said

data transfer step transfers the image data in unit of

15   rectangular image data having a predetermined size.

42.   An image processing method in an image

input/output control apparatus which includes a control

unit, connected to a memory for storing image data, for

20   controlling input/output of the image data performed

with an external apparatus, a first image processing

unit connected to an image output apparatus, a second

image processing unit connected to an image input

apparatus, and a third image processing unit, said

25   method comprising:

a data transfer step of establishing ring-like

connection between the control unit and the first image

processing unit, between the first image processing

unit and the second image processing unit, between the

second image processing unit and the third image

processing unit, and between the third image processing

5   unit and the control unit, and unidirectionally

transferring processing setting information and the

image data;

an input image processing step of performing, in

the second image processing unit, a predetermined image

10   process to the image data input by the image input

apparatus, on the basis of the processing setting

information sent from the control unit;

a conversion processing step of performing, in the

third image processing unit, a predetermined conversion

15   process to the input image data on the basis of the

processing setting information sent from the control

unit; and

an output image processing step of performing, in

the first image processing unit, a predetermined image

20   process to the image data to be output by the image

output apparatus, on the basis of the processing

setting information sent from the control unit.

43.   A method according to Claim 42, wherein

25   said input image processing step transmits the

image data input by the image input apparatus from the

second image processing unit to the third image

processing unit on the basis of the processing setting

information,

said conversion step performs the predetermined

conversion process to the image data received from the

5   second image processing unit and transmitting the

conversion-processed image data from the second image

processing unit to the control unit, on the basis of

the processing setting information,

the control unit stores the image data received

10   from the third image processing unit in the memory, and

transmits the image data in the memory to the first

image processing unit after storing the image data of a

predetermined amount in the memory, and

said output image processing step outputs the

15   image data received from the control unit, from the

first image processing unit to the image output

apparatus on the basis of the processing setting

information.

20   44.   A method according to Claim 42, wherein

the image input apparatus is a scanner for

inputting image data by reading an original image,

the image output apparatus is a printer for

printing an image on a predetermined sheet on the basis

25   of the image data,

the predetermined conversion process in the third

image processing unit is a resolution conversion

process, and

the processing setting information is the setting information for a magnification-change copying process using the scanner and the printer.

5

45. A method according to Claim 42, wherein the control unit, the first image processing unit, the second image processing unit and the third image processing unit are composed respectively on different

10 semiconductor substrates.

46. A method according to Claim 42, wherein said data transfer step transfers the image data in unit of rectangular image data having a predetermined size.

15

47. A data communication method which performs, among plural units, transmission/reception of a data packet composed of image data and a header including information concerning the image data, said method

20 comprising:

a transmission step of transmitting the data packet from a transmission-side unit; and

a reception step of receiving the data packet transmitted in said transmission step, by a reception-

25 side unit,

wherein said transmission step transmits, after transmitting the data packet, a footer including the

same information as that of the header of the

transmitted data packet, and

said reception step updates the information of the

header on the basis of the received footer.

5

48. A method according to Claim 47, further

comprising a notification step of notifying the

reception-side unit whether or not said transmission

step transmits the footer,

10   wherein, if it is unnecessary to update the

information of the header, said notification step

notifies the reception-side unit that the footer is not

transmitted.

15   49. A method according to Claim 47, wherein said

reception step writes the received data packet in a

predetermined memory, and, after receiving the footer,

updates the information of the header by writing the

information of the footer at an address where the

20   header has been written.

50. A method according to Claim 47, further

comprising an encoding step of encoding the image data

of said data packet,

25   wherein said transmission step transmits the image

data encoded in said encoding step.

51.   A method according to Claim 47, wherein the information included in the header represents an image data length.

5   52.   A data communication method which transmits a data packet composed of image data and a header including information concerning the image data to a predetermined memory, said method comprising:

a transmission step of transmitting the data

10   packet to the predetermined memory; and

a notification step of notifying the predetermined memory whether or not said transmission step transmits a footer,

wherein, in a case where the content of the header

15   is not yet determined when the data packet is transmitted in said transmission step, said notification step notifies the memory that the image data transmission ends when the last image data is transmitted, and

20   said transmission step transmits, after the notification in said notification step ended, the footer including information to update the information of the header stored in the predetermined memory.

25   53.   A data communication method which perform communication using a data packet composed of image data and a header including information concerning the

image data, among plural image processing apparatuses

performing image processes of the data packet, said

method comprising:

a transfer step of transferring said data packet

5 from the image processing apparatus on a transmission

side to the image processing apparatus on a reception

side; and

a setting step of setting either a compression

mode or a non-compression mode to the image processing

10 apparatus on the transmission side,

wherein, in a case where the compression mode is

set to the image processing apparatus on the

transmission side in said setting step, said transfer

step transfers information representing transmission of

15 a footer to the image processing apparatus on the

reception side, and, after transmitting the data

packet, transfers the footer including information to

update the information of the header transferred to the

image processing apparatus on the reception side.

20

(54) A data communication method in an image

processing apparatus which performs an image process of

a data packet composed of image data and a header

including information concerning the image data, said

25 method comprising:

an encoding step of performing a predetermined

encoding process to the image data;

a transfer step of transferring the data packet

encoded in said encoding step to a memory;

a memory control step of controlling writing of

the image data in the memory,

5   wherein said transfer step transfers, after

transferring the data packet, a footer including the

same information as that of the header of the

transferred data packet, and

said memory control step updates the information

10   of the header on the basis of the received footer.